ELECTRICAL SYSTEMS COMMISSIONING

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MOTZ ENGINEERING

AARON ALBRITTON, BCXP

- US Navy Nuclear Power Program

- Industrial Electrician

- NETA 3 Test Technician

- Mission Critical Commissioning Provider

- Motz Electrical Testing

PRESENTATION OVERVIEW

CX ORGANIZATIONS AND STANDARDS

UNDERSTANDING THE CX PROCESS

MARKET SPECIFIC CX

ORGANIZATIONS AND STANDARDS

- **ASHRAE**
  - **Focus mostly on HVAC Cx**
  - **Great for the Cx Process**
  - **Certifies Cx Professionals**

- **AABC/ACG**
  - **Focus mostly on HVAC Cx**
  - **Great for the Cx Process**
  - **Certifies Cx Professionals**

- **NETA/ANSI**
  - **Focus on Electrical testing and Cx**
  - **Certifies Test Technicians**

- **NICET**

- **NECA-90**

- **Uptime Institute**

- **IEEE**

- **NFPA**

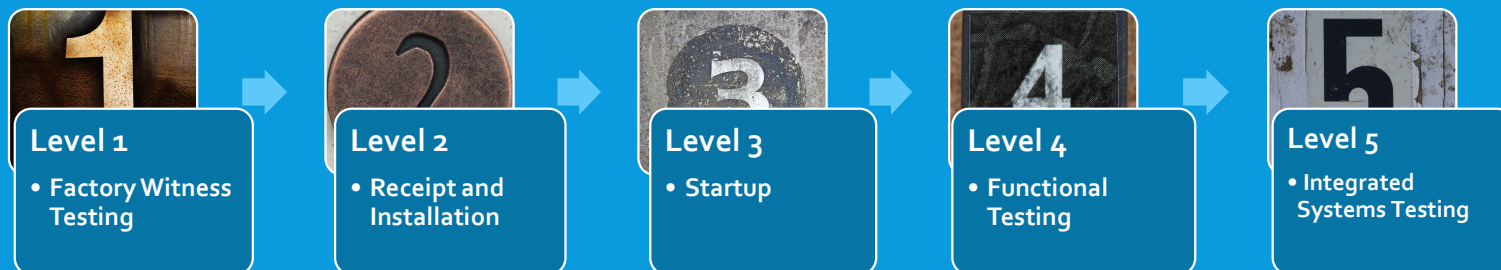- **7x24 Exchange**

- **AFCOM**

THE CX PROCESS

A qualitative process to evaluate, verify, and document equipment and systems are planned, designed, installed, tested, operated, and maintained per the owner's project requirements

- ASHRAE Cx Standard Phases

Pre-Design / Design → Construction → Acceptance → Integrated Systems Testing → Training → Post Occupancy

- Datacenter Phases (Uptime Institute)

Level 1
- Factory Witness Testing

Level 2
- Receipt and Installation

Level 3
- Startup

Level 4
- Functional Testing

Level 5
- Integrated Systems Testing

THE CX PROCESS

Pre-Design / Design

- Stakeholder meetings

- Owner's Project Requirements

- Basis of Design

- Cx Plan

Construction

- Cx Schedule
- Cx Scripts
- Equipment selection
- Installation – QA/QC
- Pre-Functional Inspections and Tests
- NETA ATS
- Energization Plan
- Startup

THE CX PROCESS

Acceptance
- Functional Testing
- Training

Integrated Systems Testing (IST)
- How systems interface and interact
- Steady-State Operations
- Casualty response and recovery

Turnover
- Training
- Systems Manual

THE CX PROCESS

Post Occupancy

- Delayed and Seasonal Testing
- Respond to warranty calls
- Update OPR
- Final Report

Ongoing Cx and Operations

- Verify operations in accordance with system design and OPR
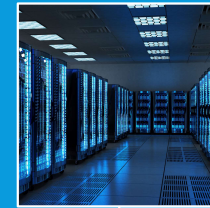- Verify ongoing maintenance is performed

MARKET SPECIFIC CX

Utility

- Point to Point
- Trip and Transfer logic
- Relay schemes
- Component testing
- Grounding and Bonding
- Inter-substation communication
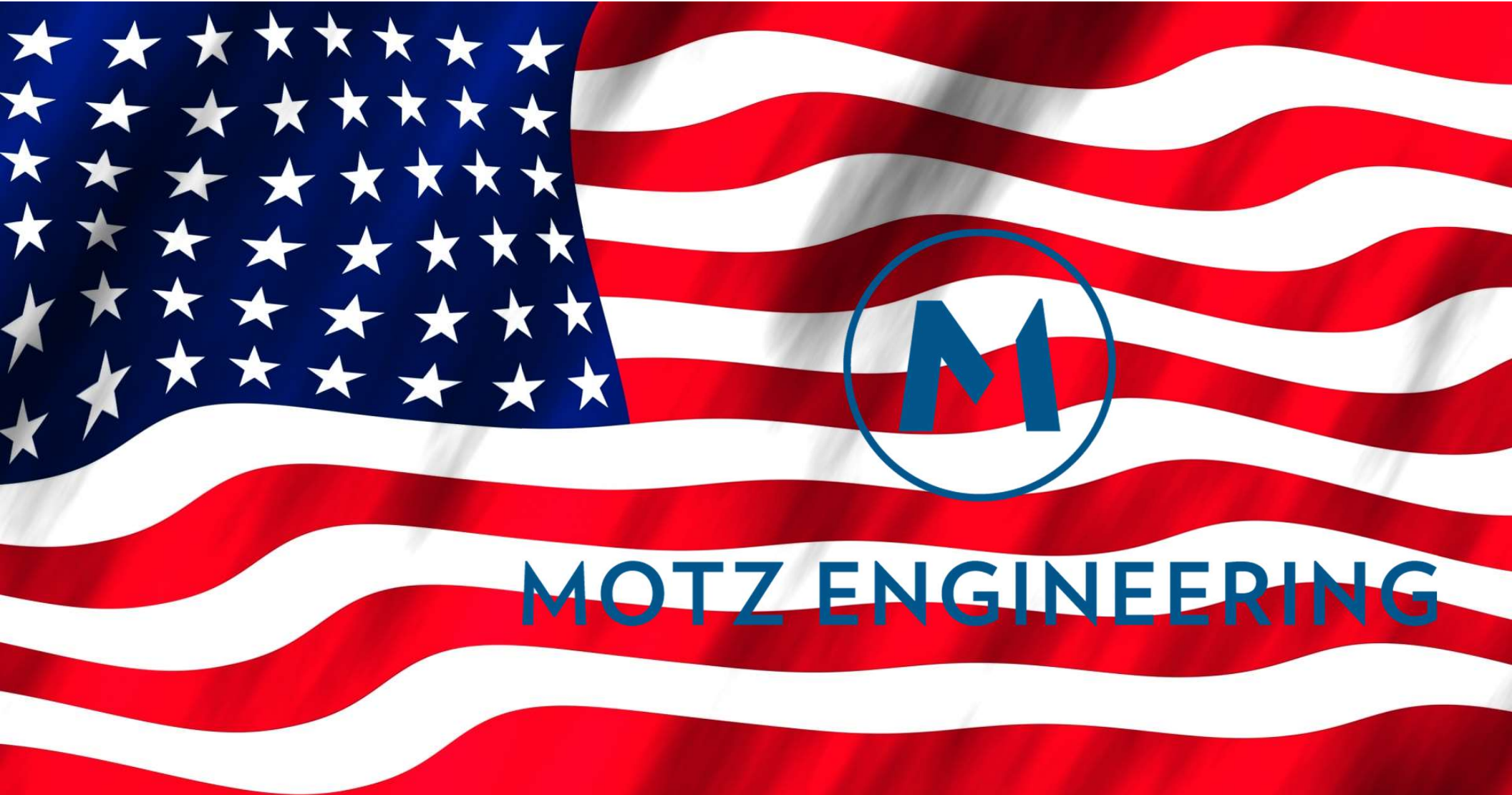- Detailed testing plans
- De-energized testing

Commercial/Industrial

- Infrared
- Switchgear automation/SOO
- EMMS
- Lighting Controls
- Small generator
- Circuit ID/Panel Schedules
- Egress/Life Safety
- Motors/Starters/VFDs

Datacenter

- Switchgear automation/SOO
- Grounding
- UPS/Generator LB
- Power Quality
- Efficiency (PUE/DCIE)
- EMMS
- BCM
- Infrared
- Integrated Systems

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Questions?